

## Relationship between the beliefs on social appearance, anxiety, and intolerance of uncertainty in rhinoplasty patients

Psychological factors associated with rhinoplasty satisfaction

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### Abstract

**Aim:** Rhinoplasty is a surgical procedure performed for functional and/or cosmetic purposes. The purpose of the study is to evaluate the psychological factors that determine patient satisfaction in rhinoplasty surgery.

**Material and Methods:** A total of 121 patients (85 women, 36 men) participated in the study. Sociodemographic data form, social appearance anxiety scale (SAAS), beliefs about appearance scale (BAAS), short form of intolerance of uncertainty (IUS) scale and rhinoplasty outcomes evaluation questionnaire (ROEQ) were applied to the participants before and at the 3rd- month control after rhinoplasty.

**Results:** Before and after the operation, patients were divided into two groups, according to their SAAS scores. Preoperative BAAS, preoperative SAAS and postoperative ROEQ scores were significantly higher in the group of patients whose SAAS scores decreased after the operation. It was determined that the change in ROEQ scores could be predicted by the change in SAAS scores ( $\beta=-0.454$ ,  $p<0.005$ ).

**Discussion:** Psychological factors such as appearance anxiety can act as a bridge between patient satisfaction and rhinoplasty outcomes. This study indicates a complex cognitive process and suggests that multidisciplinary approaches may be important to improve patient satisfaction after rhinoplasty.

### Keywords

Rhinoplasty, Physical Appearance, Patient Reported Outcomes, Cognitive Psychology

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## Introduction

Rhinoplasty is a complex surgery that not only aims to correct the shape or functional defect of the nose, but also affects the psychology of the patient. Among the surgical procedures applied to the face, this operation is a difficult surgical intervention in terms of patient satisfaction and prediction of functional and aesthetic results [1]. The nose is one of the most distinctive and characteristic structures of the face. The shape of the nose before and after the surgery is frequently interpreted by both the patients' and the people around them. It is thought that the underlying reason of the increasing rhinoplasty applications in recent years may be related to the appearance of the nose rather than the functional contribution of rhinoplasty.

Appearance is not only a physical condition, it is a complex process that also includes the meaning, interpretation and emotions related to appearance. Beliefs about appearance are the thoughts that consist of both a person's thoughts about his/her body and appearance, and about possible views of the outside world on his/her body and appearance. These thoughts can affect people's self-worth and social interactions. According to cognitive theory, emotions arise on the ground of thoughts. Consequently, negative beliefs about appearance can also cause anxiety. Elements of appearance such as height, weight, skin color, facial features can cause social appearance anxiety. In summary, social appearance anxiety is the negative affectivity that people experience because of their thought that they will be negatively evaluated because of their physical characteristics [2].

Another important concept is uncertainty. It is known that uncertainty can increase positive and negative affectivity depending on its context [3]. Intolerance of uncertainty is a cognitive structure that includes emotional, cognitive and behavioral processes [4]. Intolerance of uncertainty represents an important cognitive construct in relation to negative affectivity. The uncertainty that people experience before such an important surgery, will have an impact on their emotional and cognitive processes.

Facial appearance plays an important role in social life, therefore also has a great psychological effect. Studies have shown that quality of life increases after cosmetic surgery [5, 6]. However, the idea of the relationship between the search for cosmetic surgery and the presence of psychopathology, which was emphasized in previous periods, is no longer on the agenda. However, it has been reported that certain psychosocial factors may affect the interest and satisfaction in cosmetic surgery [7]. However, studies on these factors have generally focused on personality disorder and body dysmorphic disorder.

The aim of this study is to investigate the relationship between rhinoplasty patients' beliefs about their appearance, their anxiety about their social appearance, and their satisfaction with rhinoplasty. This study, in which preoperative and postoperative evaluations are made regarding thoughts, emotions and uncertainties within the scope of cognitive theory, is an exploratory study.

Our basic hypothesis was that after rhinoplasty surgery, patient satisfaction would increase, negative beliefs about appearance would decrease, appearance anxiety and intolerance of uncertainty would decrease.

## Material and Methods

This study was approved by the Baskent University Institutional Review Board and Ethics Committee (Project no: KA 20/459). Written informed consent was obtained from all participants.

The study prospectively included 121 consecutive participants who underwent rhinoplasty surgery at Baskent University, Department of Otorhinolaryngology between June 2020 and November 2021. A sociodemographic data form, social appearance anxiety scale, beliefs about appearance scale, short form of intolerance of uncertainty scale and rhinoplasty outcomes evaluation questionnaire were applied to the participants. Scales were applied twice before the operation and at the 3th-month-control after the operation. Exclusion criteria were defined as the diagnoses of body dysmorphic disorder, substance use disorder, psychotic disorder, mental retardation, illiteracy to fill the scales and patients who underwent closed technique rhinoplasty and revision rhinoplasty.

### Scales

#### *Sociodemographic data form:*

It is a form prepared by the research team to examine the participants' sociodemographic data such as age, gender, occupation, and additional disease.

#### *Social appearance anxiety scale (SAAS):*

It is a 5-point Likert-type scale consisting of 16 items developed to assess the social appearance anxiety of individuals [8]. The validity and reliability study of the scale in Turkish, was conducted in our country [9]. High scores in this scale indicate a high level of social appearance anxiety.

#### *Beliefs about appearance scale (BAAS):*

It is a one-dimensional, self-reporting, 20-item scale developed to measure dysfunctional thoughts and beliefs about appearance [10]. High scores indicate dysfunctional thoughts about one's appearance. Validity and reliability studies of the scale were carried out in Turkish, and it was confirmed that it is a valid and reliable measurement tool also for studies in our country [11].

#### *Intolerance of Uncertainty Scale -12 (Intolerance of uncertainty -IUS-12):*

It is a 12-item scale created to evaluate people's thoughts and attitudes towards uncertainty [12]. The total score that can be obtained from the scale varies between 12 and 60. High scores indicate a high level of intolerance of uncertainty. The Turkish validity and reliability study of the scale was conducted previously [13].

#### *Rhinoplasty Outcomes Evaluation Questionnaire (ROEQ):*

The ROEQ was developed to evaluate rhinoplasty outcomes and consists of six questions (two for each of physical, emotional, and social factors) related to patient satisfaction [14]. ROEQ, Turkish reliability and validity study was performed [15]. This scale is applied before and after the operation to evaluate rhinoplasty satisfaction.

In this study, preoperative and postoperative scale scores were defined as preX and postX.

### Statistical Analysis

All data (categorical and continuous) were analyzed using the Statistical Package for Social Science windows version 15.0 (SPSS) web software. The Kolmogorov-Smirnov test was used to evaluate whether the data fit the normal distribution or not.

Quantitative data were evaluated as mean percentage and standard deviation, and categorical variables were evaluated using Pearson's Chi-square test. Independent Sample t-test was used to compare the means of independent variables between groups. Paired samples t-test was used to compare the pre-test and post-test of the scales. The Pearson Correlation test was used to evaluate the correlation between the scores in the scale. To investigate the effect of the scale scores on each other, the differences between the post-test and pre-test scores were calculated, followed by evaluation of the differences in scores through linear regression analyses. The level of statistical significance was accepted as 0.05 in all tests.

Results

A total of 85 female (70.2%) and 36 male (20.8%) participants were included in the study. The mean age of the participants was 27.43 ± 8.58 years. According to their pre- and post-operative SAAS scores, the participants were divided into two groups: patients with increased (n= 75) and decreased (n=46) anxiety. There were no participants whose pre-operative and post-operative SAAS scores did not change. There was no significant difference between the two groups in terms of age (p=0.233) and gender (p=0.779). PreBAAS (preoperative BAAS), preSAAS (preoperative SAAS), postROEQ (postoperative ROEQ) scores were found to be significantly higher, and postSAAS and preROEQ scores were significantly lower in the SAAS decreasing group. When preoperative and postoperative test scores of the scales were examined within each group, it was

Table 1. Evaluation of the scale scores of the groups according to the SAAS scores

SCALES	Decreasing SAAS (n=46)	p <sup>1</sup>	Increasing SAAS (n= 75)	p <sup>1</sup>	p <sup>2</sup>
PostSAAS	33.76 (± 13.38)	.000 <sup>*</sup>	39.13 (± 12.10)	.000 <sup>*</sup>	.025 <sup>*</sup>
PreSAAS	39.89 (± 15.62)		30.50 (± 10.65)		.001 <sup>*</sup>
PostBAAS	32.17 (± 17.48)	.680	29.59 (± 15.15)	.000 <sup>*</sup>	.392
PreBAAS	31.43 (± 17.90)		23.52 (± 15.35)		.011 <sup>*</sup>
PostIUS	37.24 (± 11.46)	.431	38.04 (± 11.06)	.032 <sup>*</sup>	.694
PreIUS	38.43 (± 10.50)		35.25 (± 11.59)		.144
PostROEQ	84.55 (± 10.82)	.000 <sup>*</sup>	78.99 (± 11.93)	.000 <sup>*</sup>	.011 <sup>*</sup>
PreROEQ	34.60 (± 9.80)		39.12 (± 9.66)		.014 <sup>*</sup>

Post: postoperative, pre: preoperative, SAAS: Social Appearance Anxiety Scale, BAAS: Beliefs About Appearance Scale, IUS: Intolerance of uncertainty, ROEQ: Rhinoplasty Outcomes Evaluation Questionnaire, <sup>1</sup>: paired samples t-test, <sup>2</sup>: independent samples t-test

found that SAAS scores decreased and ROEQ scores increased significantly in the SAAS decreasing group. In the group with increasing SAAS, all scale scores increased significantly (Table 1).

In the next step, the correlations between the scores preoperative and postoperative the scales were examined. According to the correlation analysis, a significant negative correlation was found between preROEQ scores and preBAAS (r=-.256), postBAAS (r=-.211), preSAAS (r=-.327), postSAAS (r=-.210) and preIUS (r=-.202) scores (Table 2).

Finally, a two-stage regression analysis was applied to evaluate the effects on the change in ROEQ values. In the first stage, the effect of age and gender was evaluated and no significant impact was found on difference of ROEQ (ROEQdiff) scores (p = 0.414). In the second stage, after keeping the effect of age and gender constant, the impact of changes on difference of IUS (IUSdiff), difference of BAAS (BAASdiff), and difference of SAAS (SAASdiff) scores were examined. According to this model, SAASdiff scores were found to significantly predict ROEQdiff scores (F(5,115) = 3.215, p=0.002) (Table 3).

Discussion

According to our findings, we were largely unable to confirm our hypotheses. In particular, we found that, contrary to our expectations, post-operative anxiety increased in a significant number of patients. We found that negative beliefs about appearance and intolerance of uncertainty increased in patients with increased appearance anxiety. We found no difference in the scores of negative beliefs and intolerance of uncertainty in patients with reduced appearance anxiety. Rhinoplasty satisfaction increased in both groups, but this increase was more prominent in patients with reduced appearance anxiety. Finally, we determined the predictive effect of the change in SAAS scores on the change in ROEQ scores. We have discussed possible interpretations of our findings below. Although the surgical procedure is executed well technically, the main factor determining the success of surgery is patient satisfaction. If the patient is dissatisfied, even technically good execution of the procedure does not indicate that the procedure has been successful [16]. It is known that surgeons who perform rhinoplasty surgery tend to select appropriate patients in order to increase their chances of obtaining successful results and to reduce the probability of experiencing medicolegal problems [17]. This may be an appropriate approach in patients with

Table 2. Pearson correlation between scale scores

		PreROEQ	PostROEQ	PreBAAS	PostBAAS	PreSAAS	PostSAAS	PreIUS	PostIUS
PreROEQ	r	1	0,01	-,256 <sup>**</sup>	-,211 <sup>*</sup>	-,327 <sup>**</sup>	-,210 <sup>*</sup>	-,202 <sup>*</sup>	-,0027
PostROEQ	r	0,01	1	-,0015	-,0041	0,073	-,0126	-,0002	-,0051
PreBAAS	r	-,256 <sup>**</sup>	-,0015	1	,761 <sup>**</sup>	,619 <sup>**</sup>	,533 <sup>**</sup>	,445 <sup>**</sup>	,404 <sup>**</sup>
PostBAAS	r	-,211 <sup>*</sup>	-,0041	,761 <sup>**</sup>	1	,607 <sup>**</sup>	,649 <sup>**</sup>	,410 <sup>**</sup>	,465 <sup>**</sup>
PreSAAS	r	-,327 <sup>**</sup>	0,073	,619 <sup>**</sup>	,607 <sup>**</sup>	1	,722 <sup>**</sup>	,467 <sup>**</sup>	,309 <sup>**</sup>
PostSAAS	r	-,210 <sup>*</sup>	-,0126	,533 <sup>**</sup>	,649 <sup>**</sup>	,722 <sup>**</sup>	1	,436 <sup>**</sup>	,465 <sup>**</sup>
PreIUS	r	-,202 <sup>*</sup>	-,0002	,445 <sup>**</sup>	,410 <sup>**</sup>	,467 <sup>**</sup>	,436 <sup>**</sup>	1	,532 <sup>**</sup>
PostIUS	r	-,0027	-,0051	,404 <sup>**</sup>	,465 <sup>**</sup>	,309 <sup>**</sup>	,465 <sup>**</sup>	,532 <sup>**</sup>	1

<sup>\*\*</sup> p<0.01, <sup>\*</sup>p<0.05, Post: postoperative, pre: preoperative, SAAS: Social Appearance Anxiety Scale, BAAS: Beliefs About Appearance Scale, IUS: Intolerance of Uncertainty, ROEQ: Rhinoplasty Outcomes Evaluation Questionnaire, Pearson correlation test

**Table 3.** Simple linear regression analysis for ROEQ difference scores

Model	Adj. R Square	B	SE	β	CI (LL/UL)
Step 1	-.002				
Gender		-4.034	3.100	-.121	(-10.174/2.105)
Age		.086	.166	.048	(-.243/.414)
Step 2	.084*				
Gender		-4.071	2.995	-.122	(-10.003/1.861)
Age		.105	.159	.059	(-.210/.420)
IUSdiff		-.127	.129	-.090	(-.382/.127)
BAASdiff		-.011	.121	-.008	(-.250/.229)
SAASdiff		-.454	.145	-.291*	(-.741/-.166)

\*p < .050, SE: Standard Error, CI: Confidence Interval, LL: lower level; UL: upper level, Diff: difference (postoperative score – preoperative score), SAAS: Social Appearance Anxiety Scale, BAAS: Beliefs About Appearance Scale, IUS: Intolerance of Uncertainty

significant underlying psychiatric problems, such as body dysmorphic disorder. On the other hand, it may be an ethically important problem to provide a chance to the patients to receive medical treatment based on psychological factors. Instead, providing a multidisciplinary approach to health services regarding psychiatric factors would be a more appropriate option.

Patient satisfaction in rhinoplasty surgery is also affected by factors other than the surgical procedure. Factors such as the patient’s beliefs about the appearance of nose, anxiety about appearance, and uncertainty about post-operative appearance may affect the postoperative satisfaction of the patient. There are methodological problems in many studies evaluating the psychological factors of cosmetic surgery applications. It is obvious that only cross-sectional preoperative or postoperative evaluations can affect the objectivity of the results. For example, a patient may display a cognitive bias after the operation, making more positive evaluations on the results to justify the behavior of undergoing operation [18]. Therefore, patient satisfaction cannot be evaluated unidimensionally. In addition, the decrease in post-operative anxiety may be a result of the reduction of high pre-operative anxiety. Low expectations from surgery may also result in an exaggeratedly positive outcome [18]. At this point, it is important to evaluate the effects of pre- and postoperative cognitive factors, emotions and uncertainty associated with the surgery. Contrary to our expectations, we found that appearance anxiety increased in most of the patients after the surgery. The increase in cosmetic expectations in rhinoplasty operations may cause an increase in appearance anxiety related to the desire to be liked after surgery. A predominance of negative beliefs about appearance and increased uncertainty about being liked after surgery might be associated with these results.

While defining a patient suitable for plastic surgery, Gorney suggests that a low degree of deformity and high anxiety are associated with dissatisfaction [19]. It is also known that patients that have irrational or high expectations are associated with post-operative dissatisfaction [20]. Similarly, we think that high anxiety and negative beliefs significantly affect satisfaction scores. Our results point out that the severity of negative beliefs may be associated with anxiety and satisfaction.

In a study conducted with 56 patients in Turkey, individuals with high preoperative social appearance anxiety were found to have lower postoperative satisfaction rates [21]. According to our results, similarly, satisfaction rates were significantly higher in the group with reduced post-operative anxiety. A prospective study conducted in the United Kingdom at general surgery, Ear Nose and Throat (ENT) and maxillofacial surgery clinics compared 51 plastic surgery operations that changed appearance, with 105 surgical operations that did not change appearance. Postoperative depression and anxiety scores decreased in both groups. However, reduction in anxiety and body region-specific appearance distress was found to be greater in plastic surgery operations [18]. As a result of this study, the importance of a more detailed investigation of the role of cognitive factors associated with cosmetic surgery was emphasized. In our study, anxiety was found to be increased in a significant number of patients. One of the possible reasons for this may be that we used a questionnaire that focused on appearance anxiety when assessing anxiety. The relationship of anxiety with appearance rather than factors related to surgery might have led to different results.

Postoperative edema may decrease by 2/3 at the end of the 1st month, 95% at the 6th month, and 97.5% at the end of the first year [22]. Accordingly, it takes about a year for the nose to take its permanent shape. Factors such as the fact that the nose is visible to everyone, the comments that patient receives from his/her environment, and the expectation of rapid change may have increased the anxiety during the postoperative recovery period. In another study, although there was no change in edema and ecchymosis in patients who underwent postoperative infraorbital taping, anxiety decreased [23]. In this regard, it would be beneficial to investigate methods that can provide physical encouragement, such as applying massage besides accurate information, to reduce the patient’s postoperative appearance anxiety.

In our study, we did not detect a significant effect of age and gender on satisfaction. We have concerns about those other studied factors will cause patients to be stigmatized and will decrease their chance of receiving medical treatment. Furthermore, it is obvious that these results from previous studies are controversial. In another review from 2006, psychological outcomes in plastic surgery were associated with poor methodological quality, pointing to the difficulty of commenting on treatment efficacy [24]. The adjusted R-squared values we determined in the simple linear regression analyzes are very modest. However, considering our analysis based on the change between pre- and post-scale scores instead of the direct scores of the scales, these values can be considered to be statistically significant. From a methodological point of view, we think that our findings are important.

In this study, it can be said that in terms of methodology, psychological factors are discussed in more detail on the ground of cognitive theory. However, it could be a problem that it did not include a control group, and the effects of some other possible cognitive factors were not included in evaluation. The following statement has been added to the discussion section. Post-surgical anxiety, beliefs about appearance, intolerance to uncertainty may change over time. Therefore, re-evaluation of

similar scales in the long term may lead to different results. Finally, the results in this study reflect Turkish society, and it should be noted that interpretations of appearance may produce different results in different societies. Despite the limitations of the study, we think that it will make an important contribution to the literature in terms of revealing the functional and aesthetic results of rhinoplasty as well as the psychology of the patient with pre- and post-operative evaluations.

**Conclusion**

The objective of this study was to determine the psychological factors between rhinoplasty surgery and patient satisfaction. For this purpose, we aimed to evaluate patient satisfaction through considering thoughts, emotions, and uncertainty on the ground of cognitive theory. This relationship points out a complex process and further research is needed. We suggest that postoperative satisfaction can be increased with appropriate preoperative evaluation and in case of need a multidisciplinary approach.

**Scientific Responsibility Statement**

The authors declare that they are responsible for the article's scientific content including study design, data collection, analysis and interpretation, writing, some of the main line, or all of the preparation and scientific review of the contents and approval of the final version of the article.

**Animal and human rights statement**

All procedures performed in this study were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. No animal or human studies were carried out by the authors for this article.

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**Conflict of interest**

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